

Claims:

1. An apparatus (400) for processing a stream of fixed-length packets received as digitally encoded signals and having multiple packet types, each packet including a header portion, the header portion containing a checksum-encoded synchronization-byte, the apparatus comprising:

a synchronization-byte detector (220-I) for detecting position-candidates of a checksum-encoded synchronization-byte in each packet, and for periodically outputting a synchronization-byte position signal at a first detected position within each packet, wherein the Synchronization Detector (220-I) is adapted to respond to a "resync" command signal by trying to detect a checksum-encoded sync-byte in a second position within each packet.

2. The apparatus of claim 1, further comprising a False Lock Detector (540) adapted to generate and assert the "resync" command signal because at least one predefined anomaly condition that indicates a possible false-lock condition has been detected.

3. The apparatus of claim 2, wherein the False Lock Detector (540) is adapted to assert the "resync" command signal because a first predefined anomaly condition, characterized by a MPEG-2 PAT table having not been detected in the stream, has been detected.

4. The apparatus of claim 2, wherein the False Lock Detector (540) is adapted to assert the "resync" command signal because a second predefined anomaly, characterized by an expected MPEG-2 PMT table having not been detected in the transport stream, has been detected.

5. The apparatus of claim 2, wherein the False Lock Detector (540) is adapted to assert the "resync" command signal because a predefined anomaly, characterized by a supposed MPEG-2 PAT table containing invalid information, has been detected.

6. The apparatus of claim 2, wherein the False Lock Detector (540) is adapted to assert the "resync" command signal because a predefined anomaly,

characterized by a supposed MPEG-2 PMT table containing invalid information, has been detected.

7. The apparatus of claim 2, wherein the False Lock Detector (540) is  
5 adapted to assert the "resync" command signal because a third predefined anomaly, characterized by at least one of the MPEG-2 PID's listed in a MPEG-2 PMT having not been detected in the stream, has been detected.

8. The apparatus of claim 2, wherein the False Lock Detector (540) is  
10 adapted to assert the "resync" command signal because a fourth predefined anomaly, characterized by a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream, has been detected.

9. The apparatus of claim 2, wherein the False Lock Detector (540) is  
15 adapted to assert the "resync" command signal because a fifth predefined anomaly, characterized by the MPEG-2 transport\_error\_indicator bit encoded in a MPEG-2 packet's header being "1" while the MPEG-2 Error\_flag is "0", has been detected.

10. The apparatus of claim 2, wherein the synchronization-byte detector  
20 (220-I) is adapted to respond to a "resync" command signal by skipping the current detected sync-byte position and then by trying to detect the next position-candidate of a checksum-encoded synchronization-byte using the conventional checksum detection process.

25 11. The apparatus of claim 1, further comprising a Decision Logic circuit (542) adapted to generate the "resync" command signal in response to the detection of a dynamically defined selection of one or more of the following anomaly conditions  
a) through e):

- a) a MPEG-2 PAT table has not been detected in the stream;
- b) a MPEG-2 PMT table has not been detected in the stream
- c) at least one of the MPEG-2 PID's listed in a MPEG-2 PMT has not been detected in the stream;
- d) a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream has been detected;

- e) the value of the MPEG-2 transport\_error\_indicator bit detected in a MPEG-2 packet's header is "1" while the MPEG-2 Error\_flag bit is "0."

5        12. An apparatus (400) for processing a stream of fixed-length packets received as digitally encoded signals and having multiple packet types, each packet including a header portion, the header portion containing a checksum-encoded synchronization-byte, the apparatus comprising:

10      a False Lock Detector (540) adapted to generate a "resync" command signal because at least one predefined anomaly condition that indicates a possible false-lock condition has been detected.

15      13. The apparatus of claim 12, further comprising a synchronization-byte detector (220-I) for detecting position-candidates of a checksum-encoded synchronization-byte in each packet, and for periodically outputting a synchronization-byte position signal at a first detected position within each packet, wherein the Synchronization Detector (220-I) is adapted to respond to the "resync" command signal by trying to detect and to "lock" to a checksum-encoded sync-byte in a second position within each packet.

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14. The apparatus of claim 13, wherein the False Lock Detector (540) is adapted to generate and assert the "resync" command signal because at least one of the following predefined anomaly conditions, has been detected:

- 25      a) a MPEG-2 PAT table has not been detected in the stream;  
b) a MPEG-2 PMT table has not been detected in the stream  
c) at least one of the MPEG-2 PID's listed in a MPEG-2 PMT has not been detected in the stream;  
d) a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream has been detected;  
30      e) the value of the MPEG-2 transport\_error\_indicator bit detected in a MPEG-2 packet's header is "1" while the MPEG-2 Error\_flag bit is "0."

15. The apparatus of claim 14, wherein the False Lock Detector (540) includes a Decision Logic circuit (542) adapted to select at least one of anomaly

conditions a) through e) as a causal basis of the "resync" command signal to be generated and asserted by the False Lock Detector (540).

16. The apparatus of claim 14 wherein the False Lock Detector (540)  
5 includes a filter that implements hysteresis thresholding of anomaly-indicating flag values that are based upon parsing the MPEG-2 packets in the Stream as delineated by the synchronization-byte detector.

17. The apparatus of claim 16 wherein the filter is implemented by a finite  
10 state machine.

18. The apparatus of claim 14 wherein the False Lock Detector (540) includes a MPEG-2 demultiplexer/decoder of the related art.

15 19. The apparatus of claim 14 wherein the False Lock Detector (540) includes MPEG-2 Packet Parser (544) adapted to parse MPEG-2 packets in the stream.

20 20. The apparatus of claim 19 wherein the MPEG-2 Packet Parser (544) is adapted to generate anomaly-indicating flag values based upon parsing the MPEG-2 packets in the Stream as delineated by the synchronization-byte detector.

25 21. The apparatus of claim 19 wherein the MPEG-2 Packet Parser (544) includes at least one dedicated anomaly-detecting circuit.

22. The apparatus of claim 19 wherein the MPEG-2 Packet Parser (544) includes a first comparator, adapted to compare the MPEG-2 PID of a packet delineated by the synchronization-byte detector, with a table of expected PID values.

30 23. The apparatus of claim 20 wherein the False Lock Detector (540) further includes a Decision Logic circuit (542) adapted to select at least one of anomaly flags as a causal basis of the "resync" command signal to be generated and asserted by the False Lock Detector (540).

24. The apparatus of claim 12 wherein the "resync" command signal restarts the conventional process of detecting a checksum-encoded sync-byte position within the packets in the stream.

5        25. The apparatus of claim 13 further comprising an MPEG Sync-Byte Re-insertion circuit (240) for inserting a predetermined value into the sync-byte position indicated by the synchronization-byte detector (220-I).

10      26. The apparatus of claim 13, wherein the synchronization-byte detector is an MPEG-2 sync-byte detector that includes a Syndrome Detector (220-I) for detecting a checksum-encoded sync-byte.

15      27. A method for processing a stream of fixed length packets each packet containing a checksum-encoded sync-byte, the stream including a plurality of packets that each contain a first fixed bit pattern in the header portion of each packet, the method comprising:

performing a first detection step of decoding the checksum in the stream to detect a checksum-encoded sync byte position-candidate in the stream; and

20      performing a false lock detection step including detecting at least one anomaly that indicates a possible false synchronization lock; and then

performing a second detection step of decoding the checksum in the stream to detect a second checksum-encoded sync byte position-candidate in the stream.

25      28. The method of claim 27, further comprising the intermediate step of generating a "resync" command signal having a value indicating that a possible false synchronization lock has been detected, and outputting that "resync" flag signal value to a synchronization-byte detector adapted to respond to the "resync" command signal value by trying to detect and resynchronize to the next position-candidate of a checksum-encoded synchronization-byte using the conventional checksum detection process.

30      29. The method of claim 28, wherein the "resync" command signal value depends upon at least one anomaly-indicating flag value.

30. The method of claim 31 wherein the anomaly-indicating flag value depends upon one of the following anomaly conditions having been detected:

- a. at least one of the MPEG-2 PID's listed in a MPEG-2 PMT has not been detected in the stream;
- 5 b. a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream has been detected; or
- c. the value of the MPEG-2 transport\_error\_indicator bit in a MPEG-2 packet's header is "1" while the MPEG-2 Error\_flag is "0".

10 31. The method of claim 27, wherein performing the false lock detection step further includes performing at least one anomaly-detecting substep of detecting a first anomaly that indicates a possible false synchronization lock by parsing at least one of the packets.

15 32. The method of claim 27, wherein performing the false lock detection step further includes performing at a plurality of anomaly-detecting substeps wherein a plurality of anomalies that each indicate a possible false synchronization lock are detectable by parsing at least one of the packets.

20 33. The method of claim 32, wherein the plurality of anomalies includes:

- a. at least one of the MPEG-2 PID's listed in a MPEG-2 PMT has not been detected in the stream;
- b. a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream has been detected; and
- 25 c. the value of the MPEG-2 transport\_error\_indicator bit in a MPEG-2 packet's header is "1" while the MPEG-2 Error\_flag is "0".

34. The method of claim 32 wherein the anomaly-indicating flag value depends upon one of the following anomaly conditions having been detected:

- a) a MPEG-2 PAT table has not been detected in the stream;
- b) a MPEG-2 PMT table has not been detected in the stream;
- c) at least one of the MPEG-2 PID's listed in a MPEG-2 PMT has not been detected in the stream;

- d) a discontinuity in at least one MPEG-2 continuity counter for MPEG-2 packets in the stream has been detected;
- e) the value of the MPEG-2 transport\_error\_indicator bit detected in a MPEG-2 packet's header is "1" while the MPEG-2 Error\_flag is "0".

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35. The method of claim 27 further comprising the step of inserting a predetermined sync-byte value into the first detected checksum-encoded sync byte position-candidate, and after performing false lock detection step, then performing the step of inserting the predetermined sync-byte value into the second detected checksum-encoded sync byte position-candidate.

10 36. The method of claim 27, further comprising: performing a synchronization-lock step of delineating the packet boundaries of a plurality of packets based upon the position of the second detected sync-byte position candidate; and

15 performing the insertion step of inserting a predetermined sync-byte value into the second detected sync-byte position candidate in each of the plurality of packets.

37. A computer program product for a set-top-box that comprises a set of  
20 instructions, which, when loaded into the set-top-box, causes the set-top-box to carry out the method, for processing a stream of fixed length packets, claimed in claim 27.

25 38. A computer program product for a television set that comprises a set of instructions, which, when loaded into the television set, causes the television set to carry out the method, for processing a stream of fixed length packets, claimed in claim 27.